

REDACTED  
REBUTTAL TESTIMONY  
OF  
ERIC LOUNSBERRY

Engineering Department  
Energy Division  
Illinois Commerce Commission

Illinois Power Company

Proposed General Increase For Gas Rates

Confidential Information Identified As  
\*\*\*BEGIN CONF [REDACTED] END CONF\*\*\*

Docket No. 04-0476

December 28, 2004

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1 Q. Please state your name and business address.

2 A. My name is Eric Lounsberry and my business address is: Illinois Commerce  
3 Commission ("Commission"), 527 East Capitol Avenue, Springfield, Illinois  
4 62701.

5 Q. Are you the same Eric Lounsberry that previously provided testimony in this  
6 proceeding?

7 A. Yes. I previously presented Direct Testimony in this proceeding, ICC Staff  
8 Exhibit 7.0.

9 Q. What is the purpose of your rebuttal testimony?

10 A. My rebuttal testimony responds to the rebuttal testimony of Illinois Power  
11 Company ("IP" or "Company") witnesses Brian W. Blackburn, H. Gene Eagle,  
12 Wayne G. Hood, Curtis D. Kemppainen, Timothy L. Hower, and Kevin D. Shipp.  
13 I also respond to the direct testimony of John W. Mallinckrodt that was presented  
14 on behalf of the Illinois Industrial Energy Consumers ("IIEC").

15 Q. What recommendations did you make in your direct testimony?

16 A. I recommended that the Commission reduce the working capital allowance  
17 associated with the value of natural gas in storage by \$3,070,743, revise the  
18 value of the natural gas storage layers in Hillsboro by \$10,367,837, find that the  
19 Company's Hillsboro storage field is currently less than 100% used and useful,

20 and that IP account for an error in the value of a capital addition (storage well) in  
21 its rebuttal testimony.

22 Q. Does your rebuttal testimony address any topics other than those raised in your  
23 direct testimony?

24 A. Yes. My rebuttal testimony will also discuss IIEC's request to alter the level of  
25 unaccounted for gas losses that IP charges its customers.

26 Q. Do you have any schedules attached to your rebuttal testimony?

27 A. Yes. I have the following schedules attached to my rebuttal testimony:

28	Schedule 17.01	Hillsboro Used and Useful Calculation
29	Schedule 17.02	Value of Hillsboro Peak Day Capacity
30	Schedule 17.03	Hillsboro Seasonal Value

31 Q. Did the Company agree with any of the recommendations you made in your  
32 direct testimony?

33 A. Yes. In Mr. Kevin Shipp's rebuttal testimony, IP Exhibit 13.1, page 3, the  
34 Company agrees with my recommendation to reduce the working capital  
35 allowance associated with the value of natural gas in storage by \$3,070,743.  
36 Further, in Mr. Gene Eagle's rebuttal testimony, IP Exhibit 12.1, pages 4-5, the  
37 Company agreed to revise the cost of the storage well. These topics are no  
38 longer at issue between the Company and myself.

39 Q. What recommendations are you making in your rebuttal testimony regarding your  
40 proposals to which the Company did not agree?

41 A. I recommend that the Commission direct IP to not make any changes at this time  
42 to the manner that it accounts for unaccounted for gas, direct IP to revise the  
43 value of the natural gas storage layers in Hillsboro by \$10,367,837, and find that  
44 the Company's Hillsboro storage field is currently less than 100% used and  
45 useful.

46 **Unaccounted for Gas**

47 Q. Has any party raised a concern with the manner that IP calculates its unaccounted  
48 for gas?

49 A. Yes. IIEC witness John Mallinckrodt, in his direct testimony, IIEC Exhibit 1,  
50 pages 16 and 17, discussed the unaccounted for gas ("UFG") values that the  
51 Company has charged historically, provided the gas loss numbers that IP  
52 provided to the Federal Department of Transportation ("DOT"), noted that those  
53 numbers varied from the UFG values, and asked that IP change the manner that  
54 it calculates the UFG from a year to year value to a three year average.

55 Q. How did IP respond to Mr. Mallinckrodt's comments?

56 A. Company witness Brian Blackburn provided rebuttal testimony, IP Exhibit 8.6,  
57 pages 18 and 19, that addressed Mr. Mallinckrodt's comments. In particular, Mr.  
58 Blackburn explained why the UFG values used by IP differ from the DOT

59 numbers relied upon by Mr. Mallinckrodt, explained why making the changes  
60 requested by Mr. Mallinckrodt are not warranted, and noted that the UFG is  
61 simply a pass through cost incurred by IP, from which IP cannot profit in any way.  
62 Finally, Mr. Blackburn provided the UFG value that would go into place as of  
63 January 1, 2005.

64 Q. Based upon the information presented by Mr. Mallinckrodt and Mr. Blackburn, do  
65 you have an opinion on the manner in which IP calculates its UFG value?

66 A. Yes. I found no reason to disagree with the explanation and information provided  
67 by Mr. Blackburn in his rebuttal testimony; therefore, I agree with him that IP  
68 should not make any changes in the manner that it calculates its UFG value.

69 **Hillsboro Storage Field Base Inventory Value**

70 Q. What did you recommend to the Commission in your direct testimony regarding  
71 IP's request to increase the value of its recoverable base gas inventory at the  
72 Hillsboro storage field by \$10,367,838 for the test year?

73 A. I recommended the Commission reject IP's request and instead recommended  
74 that the Commission direct the Company to use Hillsboro's recoverable base gas  
75 value that the Company used prior to it making any corrections to Hillsboro base  
76 gas inventory. This recommendation resulted in the value of Hillsboro storage  
77 field's recoverable base gas volumes (Account 117 – Gas stored underground –  
78 noncurrent) being reduced by \$10,367,838. The calculation for this value was  
79 provided in my direct testimony, ICC Staff Exhibit 7.0, Schedule 7.03.

80 Q. Why did you recommend the Commission reject IP's request to increase the  
81 recoverable base gas value for its Hillsboro storage field during the test year?

82 A. IP's adjustment is premised on its hindsight determination that gas measurement  
83 errors during the period November 1993 through October 1999 caused it to  
84 withdraw recoverable base gas (gas not normally expected to be withdrawn from  
85 a storage field before it is retired) from the Hillsboro storage field. Based on the  
86 amount of recoverable base gas that IP contends was withdrawn from the  
87 Hillsboro storage field (based on its estimate of the gas measurement errors), IP  
88 estimates that the value of its base gas inventory for the test year increased by  
89 \$10,367,838 to reflect the higher price of gas that IP placed in the field to replace  
90 the volume of lower priced recoverable base gas that it estimates was withdrawn.  
91 I recommended that the Commission reject IP's request because its estimate of  
92 the gas measurement error experienced during the period November 1993  
93 through October 1999 was not accurate enough to base a recalculation of the  
94 non-current gas (recoverable base gas) amounts. I noted that IP's review  
95 determined a likely total volume error for the Hillsboro storage field and then  
96 applied a constant correction factor throughout the period during which IP  
97 believes the error existed at the field. However, IP does not have sufficient  
98 information to determine if a constant correction factor is appropriate or if some  
99 other value is necessary. Further, the total volume error, while supported by  
100 analysis from an outside entity, is also just a best guess at the volume that was  
101 not measured.

102 In particular, I raised seven concerns in my direct testimony regarding the  
103 methods IP used to calculate the amount of gas that was incorrectly measured  
104 from the Hillsboro storage field and other associated events. These concerns  
105 were:

- 106 1. The well charts used to obtain an estimate of the gas measurement  
107 error relied upon a 5-day snapshot as a proxy for the month;
- 108 2. Well chart data came from individual well meters that were not  
109 installed to American Gas Association guidelines for custody  
110 transfer meters;
- 111 3. IP failed to compile well chart data for all time periods in question;
- 112 4. IP applied a constant correction value when correction factor was  
113 likely not a constant value;
- 114 5. The reservoir simulation model is limited by the quality of its inputs;
- 115 6. The historical matching of the reservoir model to actual data relies  
116 upon information that is suspect since the inventory volume at  
117 Hillsboro has been in error for an extended period of time; and
- 118 7. Another study will be done in the future that could impact the  
119 ultimate correction number.

120 Q. Did IP address each of your seven concerns?

121 A. Yes. Witnesses Wayne Hood, Curt Kemppainen, and Timothy Hower  
122 commented on or disputed my statements in their rebuttal testimony.

123 Q. Did IP's rebuttal testimony persuade you to alter or amend your recommendation  
124 to deny IP's request to increase the value of its recoverable base gas inventory  
125 at the Hillsboro storage field by \$10,367,838?

126 A. No. As explained below, the Company's estimate of the monthly gas  
127 measurement errors remains unreliable and does not provide a reasonable or



128 sufficient basis to increase the value of the base gas inventory at the Hillsboro  
129 storage field.

130 Well Charts

131 Q. What information did IP provide in response to your first concern that IP used  
132 only five days of data as a proxy for the whole month in estimating the  
133 measurement error correction factor?

134 A. The rebuttal testimony of Wayne Hood and Curtis Kemppainen ("Panel"), IP  
135 Exhibit 14.1, pages 20 and 21, explained why the Company used only five days  
136 of information per month. According to the Company's testimony, the primary  
137 reasons the Company had for relying upon only 5 days of data per month was  
138 that attempting to use the well charts for every day, or even just 10 days per  
139 month, for the six year period was an unmanageable task because the outside  
140 vendors used to integrate the well charts would have been overwhelmed and  
141 unable to complete the task. Further, due to various reasons, the Panel indicates  
142 that well charts would not be available from all 14 injection wells on a daily basis,  
143 so there were limits on what time periods IP could conduct an integration.

144 Q. Approximately how many well charts did the Company have integrated by an  
145 outside service?

146 A. According to the Company's response to Staff data request ENG 1.92, IP had  
147 about 1,500 of the 1994 charts integrated during the mid-1990s and out of those  
148 624 were later analyzed for use in the Company's Hillsboro Deliverability Study

(IP Exhibit 14.2) dated September 16, 2004. In 2003, IP also had 309 of the 1998 charts integrated for its Hillsboro Deliverability Study.

It is also my understanding that at about the same time that IP sent the 1998 charts for integration, IP also sent out charts for the years 1996, 2000, 2002 and 2003. IP had 224 and 234 well charts integrated for the years 2000 and 2002, respectively<sup>1</sup>. IP also had 357 well charts integrated from the year 1996 and 199 well charts integrated from the year 2003<sup>2</sup>. The total number of charts that IP had integrated, during 2003, for years 1996, 1998, 2000, 2002, and 2003 equaled about 1,323.

Q. How many well charts did the Panel contend was a reasonable amount for a chart service to integrate?

A. The Panel indicates, IP Exhibit 14.1, page 2 that approximately 3,400 charts were a reasonable volume of well charts to have integrated.

Q. Do you agree that 3,400 charts was a reasonable volume limit to assign to a chart integration service?

A. Not necessarily. The Panel indicated that one chart integration service declined to provide a price quote for integrating 5,000 charts. This lends some support to IP's claim that the potential volume of charts could have overwhelmed a chart integration service. However, the goal here is to arrive at an accurate

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<sup>1</sup> Company response to Staff data request ENG 1.95.

<sup>2</sup> Company response to Staff data request ENG 1.98.

measurement correction factor. The potential for one chart integration service to be overwhelmed does not explain why IP could not send charts to several different integration services. Moreover, difficulty in obtaining more complete data does not address or demonstrate in and of itself that is it reasonable or appropriate to use some incomplete set of data. Further, the information that IP provided indicates that IP did not even approach its 3,400 limit on chart integration.

Q. Did the Company do any review of its use of the five days of data?

A. Yes. The Panel testimony, page 24, indicated that the Company calculated the correction factor subsequent to 1999 as a validity check for using 5 days of data per month to estimate a correction factor for any measurement error. The Panel indicated the errors IP calculated when comparing the data from the well charts and the Hillsboro plant metering for 2000 and 2002 were -0.95% and -2.7%, respectively. IP claimed this calculation showed the chart integration technique was a valid means for estimating the measurement error. The Panel also indicated the 2000 and 2002 check confirmed that changing the mode of operating the compressors after 1999 had increased the accuracy of the Hillsboro storage field's turbine injection metering.

Q. Do you consider the Panel discussion about why more well charts were not integrated a sufficient basis for not choosing a larger sample?

188 A. No. The Panel admits using a larger sample would provide a better statistical  
189 sample<sup>3</sup>. Further, as noted above, IP only had about 1323 charts integrated<sup>4</sup> for  
190 its Hillsboro Deliverability Study (IP Exhibit 14.2) to determine its measurement  
191 errors, but admitted that a larger number of charts (3,400) was a reasonable  
192 amount to integrate. Further, IP could have sent off more data for integration, not  
193 only from the years that no information was estimated, but also from the two  
194 years that IP used its in-house program.

195 Q. Does the Company's response cause you to alter your area of concern?

196 A. No. I agree that if IP did not have a chart for every well for every day then it  
197 could not easily integrate the data for that day, but to not attempt to use more  
198 days of chart data, if it was available, sounds more like a situation of economic  
199 concerns outweighing a full review of the available information.

200 Q. What did IP state to address your second concern that the well charts from the  
201 14 individual injection/withdrawal wells used data from orifice meters that were  
202 not set up according to AGA standards?

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<sup>3</sup> IP Exhibit 14.1, pages 20-21.

<sup>4</sup> The 1,500 well charts associated with 1994 are not included in this value because those charts were previously integrated in the mid-1990s.

203 A. The Panel testimony noted that the Company did not agree with my concern and  
204 indicated that the Peterson Study indicated \*\*\*BEGIN CONF [REDACTED]  
205 [REDACTED]  
206 [REDACTED] END CONF\*\*\*.<sup>5</sup> Further the Panel indicated that my  
207 reference to the Peterson study's comment that the injection metering should be  
208 considered for estimates only was directed to the use by the Company's gas  
209 operators of the in-house integration spreadsheet for flow computations or  
210 volumetric processing and that these comments would not apply to the 1994 and  
211 1998 well charts that were sent to an outside integration service.

212 Q. Do you agree with Company?

213 A. No. While I agree the Peterson study makes the statement IP quoted, the fact  
214 remains the individual well meters were not set up according to AGA standards  
215 for custody transfer meters. In particular, the Peterson Study, page 17, noted,  
216 \*\*\*BEGIN CONF [REDACTED]  
217 [REDACTED]  
218 [REDACTED]  
219 [REDACTED] END CONF\*\*\* Thus the ultimate accuracy of the meters cannot be  
220 determined short of removing them (and their associated piping) and testing  
221 them at the appropriate facility. This is one reason why the Peterson study's  
222 comment that the injection metering should be considered for estimates only also

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<sup>5</sup> IP Exhibit 14.1, pp. 21-22.

223 applies to the use of the 1994 and 1998 well charts that were sent to an outside  
224 integration service.

225 I believe that the Company's decision to conduct a post-1999 accuracy check  
226 between its individual well data and its turbine meter was an appropriate action,  
227 but the values IP obtained from that exercise are not comforting. The analysis  
228 showed a difference between the turbine meter reading and the individual well  
229 meter reading of -.95% and -2.7% for the years 2000 and 2002, respectively.  
230 These errors indicate the possibility that measurement error continued to exist  
231 after IP revised its method of operating the storage field compressors in 1999, or  
232 the well chart estimates are not completely accurate, or some combination of the  
233 two. Therefore, the original concerns that I raised in my direct testimony are still  
234 valid.

235 Q. Why did the Company's analysis of its meter accuracy from 2000 and 2002 when  
236 it found errors of -.95% and -2.7% concern you?

237 A. Aside from my overall misgivings from using the chart data (use of limited data  
238 and meters not set up to custody transfer specifications) the error shown for  
239 2002, -2.7%, exceeds the allowance provided in Commission rules for metering.  
240 83 Illinois Administrative Code Part 500 ("Part 500"), Section 500.190 contains  
241 the Commission's customer meter accuracy requirements, and this section notes  
242 that an in-service meter should not be more than 2% fast or slow. As I noted in  
243 my direct testimony, the Commission's Part 500 does not apply to storage field

244 metering, but for IP to show it still had errors of that magnitude even after making  
245 operating changes to its system does cause concern about the overall injection  
246 measurement accuracy after 1999.

247 Q. Do you have any other reason to suspect that the post 1999 injection metering at  
248 the Hillsboro storage field was not completely accurate?

249 A. Yes. The Company replaced the three turbine meters used to measure the  
250 storage field injections with ultrasonic meters. One meter was replaced in 2003,  
251 the other two meters were replaced in 2004.<sup>6</sup> If IP was confident about the  
252 accuracy of the injection metering, then it would not need to replace those  
253 meters.

254 Q. What information did IP provide to address your third concern that IP failed to  
255 compile well chart data for all time periods in question?

256 A. The Panel testimony noted that the 1996 and 1997 well chart data was not used  
257 because those records were not kept on the same basis as the data it was trying  
258 to adjust.<sup>7</sup> This occurred because in 1996, the "pipeline day" was changed to a  
259 9:00 AM to 9:00 AM from a noon-to-noon basis that IP had historically used on its  
260 storage well charts. It was not until 1998 that IP shifted its storage well charts to  
261 correspond to the revision in the pipeline day.

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<sup>6</sup> According to the Company's response to Staff data request ENG 1.55.

<sup>7</sup> IP Exhibit 14.1, page 23.

262 Q. Does the Panel testimony provide sufficient basis to you regarding why the  
263 Company did not integrate more charts?

264 A. No. I do understand that it would have been difficult for IP to have the 1996 and  
265 1997 well charts integrated to match the revised pipeline day. However, I do not  
266 believe it was an insurmountable task. It was possible for IP to have the chart  
267 integration service to provide it with hourly information. Using this method would  
268 have allowed IP to recreate correct 24-hour day from its 1996 and 1997 well  
269 charts. Therefore, I conclude that if IP really wanted to use the 1996 and 1997  
270 data it could have requested the chart integration service provide it in a format  
271 where IP could recreate its pipeline day. Thus, IP could have integrated more  
272 charts, but chose not to. IP has not provided any rationale for why it was  
273 unnecessary to integrate more charts. The decision appears to be based upon  
274 expediency rather than the goal of attaining the most accurate estimate possible.

275 Q. Did IP's witness make any other claims regarding this topic?

276 A. Yes. The Panel testimony, pages 24-25, indicated the Peterson Study noted that  
277 the range of difference between the turbine injection meters and the well meters  
278 is 1.2% to 32% and that the 22% correction factor used in the chart integration  
279 study is well inside that range. Further, as of the end of November 2004, IP had  
280 injected an additional 2.6 Bcf of gas into Hillsboro over a two-year time span  
281 without gas being seen in two key observation wells. Based on that, IP  
282 concluded it was reasonable to conclude the 1995 and 1999 correction factors of



283 7% and 8.9%, respectively, were too low. The Panel then concluded that review  
284 indicated the reasonableness of the 22% correction factor.

285 Q. Do you agree that the 22% correction factor is reasonable?

286 A. No. I agree with IP that the 22% value did fall within the range of measurement  
287 errors provided from the Peterson Study. The range provided from the Peterson  
288 study, 1.2% - 32% was extremely broad. Every number that IP calculated from  
289 the well chart data also met that criterion, which means that fact, in and of itself,  
290 is virtually meaningless.

291 Further, IP discussed how its actual experience with the re-injection of 2.6 Bcf of  
292 gas through November 2004 indicated that the two smallest values, 7.0% and  
293 8.9%, that it calculated from the well chart data were incorrect. However, IP  
294 indicated both of those values were calculated from using IP's in-house program,  
295 which the Peterson Study indicated was not completely accurate, instead of  
296 having the data from those years integrated. Therefore, all IP has done is to  
297 confirm the Peterson Study conclusion that using well chart data with IP's in-  
298 house program provides inaccurate results.

299 Finally, IP admitted it only used the more accurate integration procedure to  
300 estimate the metering error for two years, while four other years of data was not  
301 integrated for the purpose of calculating a correction factor value. The bottom  
302 line is that while IP did find a number through the chart integration process that  
303 matched the value it ultimately determined to use, but it is also obvious that the

304 values calculated through the chart integration process are not consistent with  
305 each other (22.1% and 12.7%). Based on all of the above concerns, I consider  
306 the Company's reliance on the chart integration values to be unreasonable and  
307 insufficient.

308 Constant Factor

309 Q. How did IP respond to your fourth concern that the Company used a constant  
310 correction value to calculate the corrections needed to the Hillsboro storage  
311 field's inventory values?

312 A. The Panel testimony, pages 25-26, indicated that compressor loading is not a  
313 function of time; rather, it is dependent on suction pressure, outlet pressure,  
314 required hourly throughput, and the number of compressors on line, all of which  
315 change on a daily basis, depending on system requirements for the day.  
316 Therefore, the Panel concluded that using an average of the daily value is  
317 appropriate.

318 The Panel also indicated that it had created a "stepped profile" of correction  
319 factors. The Panel indicated the measurement volume calculated from that  
320 exercise was 5.2 Bcf, which the Panel indicated was not significantly different  
321 from the results obtained from using the constant correction factor. The constant  
322 correction factor determined a measurement correction of 5.8 Bcf.

323 Next, the Panel indicated that I made an error in my testimony by suggesting the  
324 compressors changed speeds, because the compressors are constant speed  
325 compressors.

326 Finally, Mr. Hower, IP Exhibit 17.1, page 12, indicated that he thought I meant  
327 “constant correction” instead of “consistent correction” when I discussed the  
328 Company’s measurement correction assumptions.

329 Q. Did the Panel’s discussion alleviate your concern about the Company assuming  
330 a constant correction factor for the metering error?

331 A. No. Although I agree that my direct testimony reference to “same average  
332 speed” for the compressor should have been to “same average loading” and that  
333 using the phrase “constant correction” is more appropriate then the phrase  
334 “consistent correction”; my original conclusion remains unchanged. In my  
335 opinion, there are too many variables (suction pressure, outlet pressure, required  
336 hourly throughput, and the number of compressors on line) in play for the meter  
337 correction factor to be a constant value. This is demonstrated most obviously by  
338 the varying metering correction values provided from the well chart data.  
339 Further, as the Panel indicated, making somewhat different assumptions, such  
340 as a stepped profile, will provide different results. In particular, the example  
341 provided by the Panel showed a variance of .6 Bcf (5.8 – 5.2). This variance,  
342 using a \$5.00/Mcf gas cost, corresponds to about a difference of \$3,000,000  
343 (600,000 Mcf x \$5.00/Mcf) in value. Therefore, I maintain my original conclusion.

344 Reservoir Simulation Model

345 Q. What was your fifth concern regarding the methods used by the Company to  
346 calculate the amount of gas that was incorrectly measured from the Hillsboro  
347 storage field?

348 A. My fifth concern was that the reservoir simulation model is limited by the quality  
349 of its inputs. In particular, I noted that the Hillsboro storage field covers an area  
350 equal to 5,247 acres (8.2 square miles), and the reservoir models makes use of  
351 various data from 24 wells to reach conclusions regarding the operations of the  
352 field.

353 Q. How did the Company respond to your fifth concern?

354 A. Company witness Hower provided rebuttal testimony, IP Exhibit 17.1, page 13,  
355 that noted Mr. Hower routinely uses reservoir simulation to evaluate hydrocarbon  
356 reservoirs that are much larger than 8.2 square miles and contain significantly  
357 fewer wells than the 24 wells at Hillsboro. Next, Mr. Hower indicated that those  
358 evaluations are used to assess the proved reserves volume associated with the  
359 reservoirs. Further, the reserves certifications that he prepares using the  
360 reservoir simulator models adhere to the standards defined by SPE and SEC that  
361 that those standards are used by companies, financial institutions, and in some  
362 cases countries, as a basis for investing hundreds of millions of dollars.

363 Q. How do you respond to Mr. Hower's comments?

364 A. For the most part, I do not disagree with Mr. Hower's comments. However, Mr.  
365 Hower's observations are not relevant for the purposes of setting regulated rates.  
366 The discussion about how the simulator model is used primarily involve  
367 companies who are providing that information to meet government disclosure  
368 requirements or for investors to use in determining whether or not to invest in the  
369 company. In this proceeding, the Commission is making ratemaking decisions  
370 for ratepayers who have no or very little choice about how IP manages its  
371 operations. Instead, the Commission is charged with ensure that only "just and  
372 reasonable" rates are charged to those customers. My review indicated the  
373 Company's number is an estimate. Further, Mr. Hower agrees with that position.  
374 In particular, Mr. Hower indicated, IP Exhibit 17.1, page 5, that there is of course  
375 uncertainty associated with any study or interpretation of a sub-surface reservoir.  
376 In order to be relied upon for ratemaking purposes the Company must provide a  
377 reliable methodology that results in an accurate calculation of the amount of gas  
378 that was incorrectly measured from the Hillsboro storage field.

379 Further, much of Mr. Hower's discussion on this topic appears to involve natural  
380 gas production reservoir. However, there is a distinction between a production  
381 reservoir and an aquifer storage reservoir. In particular, Mr. Hower references  
382 "proved reserves", IP Exhibit 17.1, page 13, which is a term generally used for  
383 production reservoirs<sup>8</sup>. Once a company locates a natural gas bearing reservoir,

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<sup>8</sup> A production facility refers to a natural gas reservoir located in the production area whose purpose is to provide daily supply capacity to the interstate pipeline system. These reservoirs are produced (gas withdrawn) until the reservoir is depleted.

the analysis discussed by Mr. Hower provides an estimate of the total volume of gas in the production reservoir. This estimate forms a basis for various entities to perform economic evaluations on the reservoir in question.

An aquifer storage reservoir, such as Hillsboro, did not originally contain natural gas. When it was developed, the utility requested the Commission's permission to develop the reservoir. In developing the reservoir a known volume of gas was injected into the reservoir, then a known amount of gas was withdrawn and injected into the reservoir every year. However, in IP's case with the Hillsboro storage field, the volume actually maintained in the field is no longer a known value due to the various reasons discussed in this proceeding.

Therefore, my recommendation for how IP would recover the costs associated with replacing the gas caused by the measurement error involves passing the cost of the replacement gas (a known volume) through the PGA once it was injected into the field. This approach would ensure only the just and reasonable costs associated with IP's actions are charged to ratepayers.

Q. What was your sixth concern regarding the methods used by the Company to calculate the amount of gas that was incorrectly measured from the Hillsboro storage field?

A. I raised the concern that the historical matching of the reservoir model to actual data relies upon information that is suspect since the inventory volume at Hillsboro has been in error for an extended period of time.

405 Q. How did the Company respond to your sixth concern?

406 A. Mr. Hower, IP Exhibit 17.1, page 14, indicated that the Hillsboro reservoir  
407 simulation model was constructed on a foundation of a large amount of data,  
408 such as the 3-D seismic, the core data, the special core analysis, the  
409 petrophysical calculations, and measurements of well and field pressures. He  
410 indicated that this data is accurate and known. Next, he indicated that only the  
411 historic gas injection volumes are in question. Therefore, Mr. Hower concluded  
412 that the approach used in the simulation study was to treat all of the other critical  
413 variables in the numerical model as known and to vary the gas injection volumes  
414 as the sensitivity parameter. The result selected from the simulation studies was  
415 the run that produced the best comparison with the measured field data.

416 Q. How do you respond to Mr. Hower's comments?

417 A. Although I do not disagree with Mr. Hower's statements in general, his comments  
418 do not provide a basis for changing my recommendation. The fact remains that  
419 as IP adds more gas into the field the Company has very little or no data  
420 regarding the behavior of the Hillsboro storage field once all or even a portion of  
421 the gas from the measurement error is replaced. Therefore, until the gas  
422 associated with the measurement error at Hillsboro is replaced and the data  
423 associated with that volume of inventory is obtained, the model will not have any  
424 basis upon which to make its predictions.

425 Further, it appears that the reservoir model was only matched to very recent  
426 data. Mr. Hower, IP Exhibit 17.1, page 10, indicates that the model was  
427 calibrated, or matched, against observation well pressures, shut-in field  
428 pressures, gas saturation data from the fall 2003 neutron logs, and gas-water  
429 contact levels from the fall 2003 neutron logs. I would expect that additional  
430 refinements will be made in the model as more data becomes available. This  
431 model refinement could impact the amount of gas the Company ultimately  
432 determines to replace in the Hillsboro storage field. Therefore, I continue to find  
433 the use of the reservoir simulation model unreliable.

434 Updated Study

435 Q. What was your seventh concern?

436 A. My seventh concern was that IP had indicated it was conducting an additional  
437 study and could revise its 5.8 Bcf estimate of the volume of gas it needs to  
438 replace at the Hillsboro storage field.

439 Q. How did the Company respond to your seventh concern?

440 A. Mr. Hower, IP Exhibit 17.1, page 15, indicated that he found it remarkable that I  
441 would question IP for continuing to monitor, collect information, and refine its  
442 interpretations of the Hillsboro storage field. Specifically, Mr. Hower indicated  
443 that IP would be acting as a prudent operator by continuing to collect data and  
444 continuing to refine its interpretations of the Hillsboro storage field.



445 Q. How do you respond to Mr. Hower's comments?

446 A. First, I believe Mr. Hower has misinterpreted my direct testimony comments. I  
447 agree with Mr. Hower that IP would be remiss if it did not continue to collect data  
448 and continue to refine its interpretations of the Hillsboro storage field. However,  
449 my point was and continues to be that as IP gathers more information regarding  
450 the operation of the field, as I discussed above, the model will likely change.  
451 Further, as IP continues to replace the gas into the Hillsboro storage field, the  
452 Company will start to gather data from the field for inventory levels that have not  
453 been seen for almost ten years. I conclude that this also means the ultimate  
454 volume of gas that IP determines to inject into the Hillsboro storage field could  
455 also change. This ultimate measurement error correction could be larger or  
456 smaller than the 5.8 Bcf volume that IP has calculated thus far. Any change to  
457 the measurement error volume directly impacts the Company's estimate of its  
458 use of recoverable base gas and the monetary impact on this gas as well.

459 Q. Based upon the above discussion of your seven concerns, do you continue to  
460 recommend that the Commission reject IP's request?

461 A. Yes. For the reasons articulated earlier in my testimony, I continue to find the  
462 Company's data to be insufficient for purposes of calculating a revised  
463 recoverable base gas value for the Hillsboro storage field. I recommend that the  
464 Commission direct the Company to use Hillsboro's recoverable base gas value

465 that the Company used prior to making any corrections to Hillsboro base gas  
466 inventory.

467 **Used and Useful Review of Hillsboro Storage Field**

468 Q. What did you conclude in your direct testimony regarding Hillsboro storage field?

469 A. I concluded that given the manner that the Company is currently operating the  
470 storage field, I do not believe it is 100% used and useful at this time.

471 Q. What used and useful percentage did you determine for the Hillsboro storage  
472 field in your direct testimony?

473 A. As shown on ICC Staff Exhibit 7.0, Schedule 7.04, I calculated the Hillsboro's  
474 used and useful percentage to be 53.94%.

475 Q. Did IP agree with your conclusion that the Hillsboro storage field was 53.94%  
476 used and useful?

477 A. No.

478 Q. Have you recalculated the used and useful percentage for the Hillsboro storage  
479 field in your rebuttal testimony?

480 A. Yes. As shown on ICC Staff Exhibit 17.0, Schedule 17.01, I calculated the  
481 Hillsboro's used and useful percentage to be 53.44%.

482 Q. Why did you change your recommended used and useful percentage value?

483 A. Company witness Shipp indicated in rebuttal testimony, IP Exhibit 13.1, page 9,  
484 that I had an error on Schedule 7.05, line 2. Once that error was corrected, the  
485 resulting used and useful percentage was slightly less than my original value.  
486 ICC Staff Exhibit 17.0, Schedule 17.02, corrects the error pointed out by Mr.  
487 Shipp. The correction to this schedule also impacted one other schedule  
488 involving the used and useful calculation. ICC Staff Exhibit 17.0, Schedule 17.03  
489 was also impacted by the error, discussed above, in ICC Staff Exhibit 7.0,  
490 Schedule 7.02, line 2.

491 Q. Why did you consider a portion of the Hillsboro storage field to not be “used and  
492 useful”?

493 A. In my direct testimony, I indicated that the Hillsboro storage field is not currently  
494 and has not for some time operated in the manner it was designed to operate. IP  
495 expanded the field in 1993 and passed the cost of this expansion to ratepayers in  
496 its last rate case, Docket No. 93-0183. Since the rates from that case were  
497 implemented, IP’s ratepayers have paid rates based on a 100% used and useful  
498 Hillsboro storage field.

499 My direct testimony also indicated that IP has an obligation to its customers to  
500 provide “...adequate, efficient, reliable, environmentally safe and least-cost public  
501 utility services which accurately reflect the long-term cost of such services and  
502 which are equitable to all citizens.” (PUA, Section 1-102) As part of that

503 obligation, IP is responsible for maintaining its storage fields in an appropriate  
504 manner.

505 Next, I indicated that IP failed to maintain its storage fields in an appropriate  
506 manner and it is not equitable for ratepayers to continue paying for the Hillsboro  
507 storage field as if it were operating at 100% used and useful, when in reality, the  
508 Hillsboro storage field is not and has not been so operating for quite some time.

509 Finally, I noted several overall concerns with IP's storage operations. In  
510 particular I noted the following four items:

- 511 1. It is rare and unusual for a utility to reduce the peak day capacity  
512 rating at a storage field;
- 513 2. The reduction in management manpower for IP's storage fields;
- 514 3. A reduction to the capital expenditures at the storage fields; and
- 515 4. Several events indicate that IP's poor oversight caused it to fail to  
516 properly identify problems or conduct effective root cause analyses.

517 Q. How did IP respond to your rebuttal testimony?

518 A. IP provided the rebuttal testimony of witnesses Kevin Shipp, Wayne Hood, Curt  
519 Kemppainen, and Timothy Hower.

520 Q. Did IP's rebuttal testimonies persuade you to alter or amend your used and  
521 useful recommendation?

522 A. No. With the exception of the correction of an error discussed above, my  
523 recommendation remains the same.

524 Used and Useful Calculation

525 Q. Did IP take issue with the manner that you calculated the used and useful  
526 percentage of the Hillsboro storage field?

527 A. Yes. Aside from pointing out the error in my calculation, Mr. Shipp also made  
528 several recommendations regarding the manner the used and useful calculation  
529 could be calculated if the Commission were to determine some disallowance was  
530 appropriate. In particular, Mr. Shipp made the following recommendations and  
531 observations:

- 532 1. Use a different 3-year period to calculate the used and useful  
533 values;
- 534 2. Use different capacity costs;
- 535 3. Use of a different methodology to calculate seasonal savings  
536 associated with storage; and
- 537 4. There is an alternative method to calculate used and useful values.

538 Period Selected for Used and Useful Calculation

539 Q. What 3-year period did Mr. Shipp recommend that the Commission use if it  
540 determines a used and useful disallowance is appropriate?

541 A. Mr. Shipp stated, IP Exhibit 13.1, page 10, that the appropriate three-year period  
542 for the purpose of this case would be the following winter seasons, 2003-2004,  
543 2004-2005, and 2005-2006. His basis for these years was that when the  
544 Commission calculated a used and useful disallowance associated with IP's  
545 Clinton nuclear plant in prior dockets, he stated the Commission more typically

546 used three year periods consisting of the year prior to the order, the year of the  
547 order, and the year following the order.

548 Q. Do you agree with Mr. Shipp's rationale?

549 A. No. I agree that generally the Commission dealt with the used and useful issue  
550 for the Clinton nuclear plant using the three-year period discussed by Mr. Shipp.  
551 However, that is not the manner the Commission always determined any used  
552 and useful values. The Commission in its February 24, 1993, Revised Order on  
553 Remand from Docket Nos. 87-0427/87-0169/88-0219/88-0253/90-0169  
554 Consolidated made use of a three-year average that centered on the test year.  
555 Obviously, the Commission can use its discretion to select the appropriate used  
556 and useful period to review based upon the circumstances surrounding the  
557 calculation.

558 Q. Are the circumstances involving your used and useful calculation unique from  
559 those employed by the Commission in determining the used and useful status of  
560 nuclear plants?

561 A. Yes. Unlike the nuclear plants examples, my recommendation for the Hillsboro  
562 storage field involves an asset that was already found fully used and useful, but  
563 based upon its operation, it is no longer 100% used and useful. To the best of  
564 my knowledge, the Commission has not faced this situation in any prior case.

565 Q. What three-year period do you use in your direct testimony in making your used  
566 and useful calculation?

567 A. My direct testimony indicated that I used the years 2001-2003. However, it is  
568 more accurate to note that I used the actual results from the 2001-2002, 2002-  
569 2003, and 2003-2004 winter seasons.

570 Q. Do you continue to support the use of the three-year period that was used in your  
571 direct testimony?

572 A. Yes. My three-year time period uses the most recent actual data available and  
573 correctly accounts for the actual operation of the Hillsboro storage field. Further,  
574 the manner that I calculated the used and useful value is dependent on the  
575 actual operating performance of the storage field, therefore, only historical  
576 information can be used with my calculation.

577 Value of Storage Field Capacity

578 Q. What value did you direct testimony assign to the peak day capacity of the  
579 Hillsboro storage field?

580 A. I assigned a value of \*\*\*BEGIN CONFxxxxxxx END CONF\*\*\* in my direct  
581 testimony to the peak day capacity of the Hillsboro storage field. However, as a  
582 result of correcting the error on ICC Staff Exhibit 7.0, Schedule 7.05, line 2,  
583 discussed above, the revised value is \*\*\*BEGIN CONFxxxxxxx END  
584 CONF\*\*\*, which is shown on ICC Staff Exhibit 17.0, Schedule 17.02.

585 Q. Did Mr. Shipp take issue with this value?

586 A. Yes. Mr. Shipp, IP Exhibit 13.1, page 12, indicated the assumption that I made  
587 regarding the peak day capacity value of the Hillsboro storage field was not  
588 representative of the cost IP would expect to incur to replace that capacity. Mr.  
589 Shipp indicated that the Hillsboro storage field is currently used to displace the  
590 capacity costs from both the Natural Gas Pipeline Company of America ("NGPL")  
591 and Panhandle Eastern Pipe Line Company ("PEPL"), but my analysis only took  
592 into account the NGPL contract. Mr. Shipp then conducted an analysis that used  
593 the price IP paid for capacity on both NGPL and PEPL and arrived at a revised  
594 peak day capacity value for the Hillsboro storage field of \*\*\*BEGIN  
595 CONF [REDACTED] END CONF\*\*\*. Further, Mr. Shipp indicated that he thought  
596 his value was a conservatively low price assumption.

597 Q. Do you agree with Mr. Shipp that your assumed value for the peak day capacity  
598 of the Hillsboro storage field is not the proper representation of that value?

599 A. No. I do agree with Mr. Shipp that the Hillsboro storage field does displace  
600 capacity from both the NGPL and PEPL systems; however, I believe that Mr.  
601 Shipp has overstated the peak day value of the Hillsboro storage field. The  
602 NGPL capacity rate that I used came from a recent contract that IP signed with  
603 NGPL for a large amount of capacity (the NGPL contract was for \*\*\*BEGIN  
604 CONF [REDACTED] END CONF\*\*\* per day). This level of capacity is close to the  
605 peak day capacity rating for the storage field (125,000 Mcf).



606 Also, if IP were to actually replace the capacity from the Hillsboro storage field, I  
607 would expect IP to make use of the lowest cost option. Under that circumstance  
608 the PEPL capacity is not the lowest cost option. A review of the Company's  
609 responses to Staff data requests in its most recent PGA proceeding 03-0699  
610 indicates that its PEPL capacity is actually the most expensive transportation  
611 supply option.

612 Further, if IP were to purchase a significant amount of capacity off of the PEPL  
613 system or any other interstate pipeline system, IP should obtain more of a  
614 discount than it currently receives from those pipelines. This viewpoint is also  
615 consistent with the testimony that IP and Ameren filed in its recent merger  
616 proceeding, Docket No. 04-0294. In that testimony, Applicants' Ex. 43.0, page 4,  
617 line 101, indicates that "However, with the proposed acquisition of IP, Ameren  
618 will greatly increase negotiating leverage with the interstate pipelines on behalf of  
619 IP due to the size and scale of the firm transportation and storage capacities held  
620 by all Ameren affiliates negotiating as a combined group." Therefore, I consider  
621 the value that I assigned to the peak day storage field as representative of the  
622 value it provides to IP.

623 Q. Do you have any other comments about the value of storage field capacity?

624 A. Yes. In a prior IP PGA proceeding, Docket No. 01-0701, I determined the annual  
625 value associated with 25,000 Mcf/day increment of capacity on IP's system to  
626 equal \$900,000. When this value is applied to the Hillsboro peak day capacity

627 level of 125,000 Mcf/day, it is equivalent to \$4,500,000. Obviously, the value that  
628 I assigned in this proceeding is consistent with the value from that prior case.

629 Q. Mr. Shipp, IP Exhibit 13.1, page 13, also made the comment that he is  
630 concerned as to whether IP would be able to obtain 125,000 Mcf of additional FT  
631 capacity if Hillsboro did not exist, do you agree with his statement?

632 A. I do not know if there currently exists sufficient surplus pipeline capacity to  
633 replace the Hillsboro storage field. However, I believe Mr. Shipp has missed the  
634 point of the exercise of valuing the Hillsboro storage field. I attempted to  
635 determine, in theory, what value the field's peak day capacity provides IP. To  
636 conduct that analysis, I used the most relevant example of IP purchasing a  
637 significant amount of capacity. In my opinion, the cost to IP of purchasing a  
638 significant amount of capacity is the truest measure of the value of peak day  
639 capacity of the Hillsboro storage field.

640 Seasonal Savings Calculation

641 Q. How did you calculate the benefit associated with the seasonal savings  
642 associated with the Hillsboro storage field in your direct testimony?

643 A. I compared IP's weighted average cost of gas in storage for the past five winter  
644 seasons to the weighted average price of commodity gas purchased by IP for the  
645 same time period. From the comparison I determined the average per unit  
646 savings per month IP achieved by having storage.

647 Q. Did Mr. Shipp agree with that calculation?

648 A. No. Mr. Shipp contended that the appropriate calculation would be to compare  
649 the cost of gas when it is injected into the storage field to the price of spot gas at  
650 the time of withdrawal using future prices and not historical prices.

651 Q. Do you agree with Mr. Shipp's analysis?

652 A. No. My calculation provided the actual historical seasonal savings value that the  
653 storage field has provided to ratepayers on a monthly basis. Since the Company  
654 selected a historical test year, the use of historical information is more  
655 appropriate, while the use of future forecasted information, such as that used by  
656 Mr. Shipp, is obviously not a known and measurable value.

657 Q. Mr. Shipp, IP Exhibit 13.1, page 14, also indicates that your analysis used an  
658 inappropriate comparison of the weighted average cost of gas to spot purchases.  
659 How do you respond?

660 A. I disagree with Mr. Shipp's conclusion that my analysis is an inappropriate  
661 comparison. I made use of the available information to develop a reasonable  
662 proxy of the seasonal value of the storage field. Further, prior to my calculation, I  
663 requested, in ENG 1.47, that IP provide its estimated savings that resulted from  
664 the operation of the company owned storage fields from the prior five years. IP  
665 simply indicated in its response, in part, that it had not performed this calculation.

666 Q. Do you agree with Mr. Shipp's discussion regarding the valuation of the seasonal  
667 storage value?

668 A. No. My analysis used actual results to determine the value of storage. Mr.  
669 Shipp's analysis attempts to look at forward prices to estimate the value of  
670 storage in the future. Since my analysis relies on actual operating history, I  
671 consider my values to more accurately reflect the seasonal price differential and  
672 resulting savings associated with storage.

673 Alternative Used and Useful Calculations

674 Q. Aside from disagreeing with the manner that you calculated your used and useful  
675 values, did Mr. Shipp have any other comments regarding used and useful  
676 calculations?

677 A. Yes. Mr. Shipp, IP Exhibit 13.1, page 14, discussed a potential alternative  
678 means of determining any used and useful calculation. Mr. Shipp noted that in  
679 the original order that placed the Hillsboro storage field into rate base (Docket  
680 No. 93-0183), the peak day capacity value of Hillsboro accounted for 93% of the  
681 projected savings, while seasonal savings value accounted for only 7%. Mr.  
682 Shipp then took these values and made various calculations under varying  
683 assumptions and years to calculate different used and useful values.

684 Q. Does Mr. Shipp recommend that these values be used instead of the one he  
685 calculated?

686 A. No, it appears Mr. Shipp is attempting to show that his used and useful  
687 calculation is consistent with the savings assumptions from over ten years ago  
688 when the Hillsboro storage field was expanded.

689 Q. Do you agree with Mr. Shipp's discussion about this topic?

690 A. No. It appears that Mr. Shipp is attempting to show how his analyses provide  
691 results that are similar to the results in Docket No. 93-0183. However, his  
692 approach ignores reality. Any reliance on his discussion of alternative used and  
693 useful calculations would suggest that the natural gas industry has been static  
694 over the last ten years. Instead, it is obvious that many changes have occurred  
695 over the last ten years, including the apparent reduction to the cost of peak day  
696 transportation capacity. Therefore, the reliance on recent actual data, which is  
697 used in Staff's analysis, is the preferable option.

698 Overall Storage Concerns

699 Q. Aside from your used and useful analysis, did your direct testimony discuss any  
700 other topics regarding storage?

701 A. Yes. My direct testimony mentioned several overall concerns regarding the  
702 manner that IP has operated its natural gas storage fields. I consider these  
703 concerns relevant to the used and useful discussion because IP has the  
704 responsibility to maintain the capabilities of its storage facilities. In particular I  
705 noted the following four areas of concern:

- 706 1. It is rate and unusual for a utility to reduce the peak day capacity  
707 rating at a storage field;
- 708 2. The reduction in management manpower for IP's storage fields;
- 709 3. A reduction to the capital expenditures at the storage fields; and
- 710 4. Several events indicate that IP's poor oversight caused it to fail to  
711 properly identify problems or conduct effective root cause analyses.

712 Reduction in Peak Day Capacity

713 Q. What did you indicate in your direct testimony regarding your experience with  
714 Illinois utilities reducing their storage field's peak day capacities?

715 A. I noted that during my 15-year tenure at the Commission, I can recall only one  
716 other utility that reduced the peak day capacity of one of its storage fields.  
717 However, on that occasion the basis for the reduced peak day capacity dealt with  
718 the purposeful reduction in inventory at the field. IP, on the other hand,  
719 experienced an unintended reduction in inventory of such magnitude that it had  
720 to reduce the peak day capacity of its storage fields. Therefore, that fact that IP  
721 had to reduce the ratings at its two largest storage fields is not a positive  
722 indication of its management or oversight over those facilities.

723 Q. How did the Company respond to your comments?

724 A. Mr. Shipp, IP Exhibit 13.1, pages 21 and 22, correctly noted that IP had  
725 previously reduced the peak day capacities at its two largest storage fields  
726 (Hillsboro from 1999 – 2003, and Shanghai 2001-2002 winter season), and that  
727 both of the fields are currently at their original peak day rating.

Further, Mr. Hower, IP Exhibit 17.1, page 18, expressed surprise that I was concerned that IP had experienced a deliverability decline at its two largest storage fields. In particular, Mr. Hower indicated that deliverability decline has been reported to be the most common problem in the gas storage industry. In particular, Mr. Hower noted that a press release regarding a U.S. Department of Energy study on storage fields indicated that one of the primary reasons for initiating the project was that gas storage well and fields often suffer a decline in productivity after several years of withdrawal and injection cycling.

Q. Do you dispute the Company's above statements?

A. No. I agree with Mr. Shipp that IP, at the present time, is operating its storage fields at their rated peak day capacities. I intended in my direct testimony to be clear that my reference was to recent reduction to the peak day capacity. I also agree with Mr. Hower that storage well and field deliverability declines are not uncommon in the industry.

However, both Mr. Shipp and Mr. Hower missed the point of my comments, which were aimed at the magnitude of IP's problems. Even though IP and every other storage operator in the State of Illinois and likely the United States knows of the potential for storage deliverability decline, IP is the only storage field operator in the state to experience problems to such depth that it needed to reduce the peak day capacity rating at its two largest storage fields. I would expect every storage operator in Illinois has experienced some problems at their

749 fields over the past 15 years, but IP is the only utility to reduce the peak day  
750 capacity of its fields as a result.

751 Q. Did IP provide any other information on this topic?

752 A. Yes. Mr. Hower, IP Exhibit 17.1, pages 19 and 20, references IP Exhibit 17.2  
753 and IP Exhibit 17.3. IP Exhibit 17.2 is a comparison of the various performance  
754 parameters of U.S. aquifer gas storage reservoirs assuming IP had its full 7.6 Bcf  
755 of gas within the field. Mr. Hower took the information and ranked the fields  
756 based on their ratio of working gas to base gas inventory. In particular, Mr.  
757 Hower claimed that the higher the ratio, the more efficient the storage field. Next,  
758 Mr. Hower, in IP Exhibit 17.3, took the same ratios, but used IP's latest estimated  
759 inventory level for the Hillsboro storage field. Mr. Hower noted that even using  
760 the lower inventory level, IP's ratio ranking was still "more efficient" than nine  
761 other Illinois/Indiana aquifer storage fields. Mr. Hower concluded, that based on  
762 that review, IP had done a commendable job keeping the field operating as  
763 efficiently as it has.

764 Q. How do you respond to Mr. Hower's analysis?

765 A. The "efficiency" (ratio of working gas to base gas) of a particular field is largely  
766 dependent on the geology and physical characteristics of the reservoir itself. The  
767 utility itself has only a limited impact on this value unless it experiences a  
768 problem. This facet is shown in Mr. Hower's analysis when IP's actions



769 (measurement error causing drastic reduction in working gas inventory) caused  
770 its efficiency rating to drop.

771 Further, a review of IP Exhibit 17.2 shows that the utility that operates the top  
772 rated field in Illinois (Nicor with the Troy Grove field) also operates many of the  
773 fields shown toward the bottom of the list. Obviously, Nicor's overall storage  
774 management should not differ significantly from field to field. Therefore,  
775 something else, such as the geology and physical characteristics of the reservoir  
776 itself, is being shown on this Exhibit, not any true measure of efficiency.

777 Q. Do you agree with Mr. Hower contention that his analysis on IP Exhibit 17.4 that  
778 compares the ratio of maximum storage pressure to original reservoir pressure  
779 indicates that IP is operating its storage fields in a safe and reliable fashion?

780 A. No. Again, Mr. Hower puts together a chart whose variables are highly  
781 dependent on the physical characteristics of the reservoir itself. Therefore, I  
782 continue to support my original conclusion.

783 Manpower

784 Q. What conclusion did you reach in your direct testimony regarding the Company's  
785 storage field manpower levels?

786 A. I indicated that IP had reduced the number of storage field supervisors, over  
787 time, starting with four supervisors in 1991 and eventually dropping to one  
788 person at the beginning of 2000. This reduction occurred because IP determined

789 that its storage field operations could be conducted in a safe, reliable and  
790 efficient manner with one supervisor and by modifying the responsibilities of the  
791 operators and changing work practices. However, facts (1) that IP had recently  
792 reduced the peak day capacities of its two largest storage fields and (2) poor root  
793 cause analyses when reviewing storage problems leads me to the conclusion  
794 that IP's reduction in oversight has caused it to operate its storage fields in a  
795 manner that is not sufficiently safe, reliable and efficient.

796 Q. How did the Company respond to your statement?

797 A. Mr. Shipp, IP Exhibit 13.1, pages 17-18, indicated that "Manpower" levels were  
798 an issue in Docket No. 01-0701, but that the Commission did not accept Staff's  
799 recommendation for a prudence disallowance in that proceeding. Further, Mr.  
800 Shipp indicated on page 20 that the storage fields have an excellent safety  
801 record, and on pages 20-21 discussed IP's decision to institute a self-directed  
802 work team philosophy.

803 Q. Do you disagree with Mr. Shipp's statements?

804 A. No. I do not disagree with Mr. Shipp's statements. However, these facts do not  
805 explain why IP did not discover its problems at its various field earlier or why IP is  
806 the only Illinois utility experiencing these significant storage field operating  
807 problems. Therefore, I continue to support my original conclusion.

808

808 Capital Expenditures

809 Q. What conclusion did you reach in your direct testimony regarding the Company's  
810 capital expenditures for its storage operations?

811 A. I concluded that IP is unwilling to spend capital on its storage activities, which, in  
812 turn, has contributed negatively to IP's ability to maintain its storage operations.

813 Q. How did the Company respond?

814 A. Mr. Shipp indicated that he is not aware of any capital projects that were viewed  
815 as necessary or desirable that was omitted from the Company's five-year plan  
816 due to the lack of adequate capital budget. Further, he indicated that during his  
817 tenure in his present position there was not any requested project that was  
818 rejected by management due to capital budget limitations. Finally, he indicated  
819 that Staff had failed to identify any storage field projects that IP should have  
820 implemented that have not been implemented.

821 Q. How do you respond to Mr. Shipp's comments?

822 A. While I cannot dispute Mr. Shipp's statements, since I am not in possession of  
823 any detailed information regarding the Company's natural gas storage budgeting  
824 procedures that in and of itself does not detract from my conclusion. The fact  
825 remains that IP's capital expenditures levels have been reduced over time and IP  
826 has also experienced problems at its two largest storage fields. Mr. Shipp would

827 have the Commission believe that this is a coincidence. For the reasons  
828 discussed in my direct testimony; Staff does not believe it is a coincidence.

829 Further, no IP witness discussed or disputed the information contained in the due  
830 diligence reports from Docket No. 04-0294 that were quoted in my direct  
831 testimony. Therefore, my conclusion on this topic has not changed.

832 Identification of Problems

833 Q. What conclusion did you reach in your direct testimony regarding the Company's  
834 ability to identify or conduct thorough root cause analyses?

835 A. I concluded that the Company's poor oversight did not allow it to properly identify  
836 and act upon the various problems facing its storage operations. IP's inability to  
837 operate its storage in a safe, reliable, and efficient manner also causes its  
838 ratepayers to incur additional costs. I provided four examples of situations where  
839 I believed the Company failed to act properly regarding some event regarding its  
840 storage operations. These four events were as follows:

- 841 1. IP's actions regarding its December 16, 2000 investigation into an  
842 incident at the Hillsboro storage field ("Hillsboro Incident");
- 843 2. IP's overall Hillsboro metering quality;
- 844 3. IP's Hillsboro meter review study as well as the Peterson  
845 Engineering Study; and
- 846 4. IP's ability to track its gas usage.

847

847 Hillsboro Incident

848 Q. What did you conclude in your direct testimony regarding the Hillsboro incident?

849 A. I concluded that IP failed to properly investigate the root cause of the problems at  
850 Hillsboro and that it took the Company five months after the incident to determine  
851 that the tank had sufficient relief capacity to vent the pressurized gas. (See Staff  
852 Exhibit 7.0, p. 39)

853 Q. How did the Company respond to your comments?

854 A. The Panel testimony, IP Exhibit 14.1, page 29, indicated that they disagreed with  
855 my assessment and noted that IP promptly hired Packer Engineering to conduct  
856 an investigation and that the Packer report concluded the failure of the  
857 emergency relief on the produced water tank caused the explosion.

858 The Panel also indicated, IP Exhibit 14.1, page 31, that they disagreed with my  
859 statement that IP did not know about the relief capacity of the produced water  
860 tank because the Packer Engineering Report discussed this topic in its  
861 Engineering Analysis.

862 Finally, the Panel noted, IP Exhibit 14.1, page 32, the various corrective actions  
863 that were implemented as a result of the Packer Engineering Report.

864 Q. How do you respond to the Panel's statements?

865 A. I agree that IP promptly hired Packer Engineering for the purpose of determining  
866 the origin and cause of the explosion of the produced water tank. I also agree  
867 that IP implemented several corrective actions as a result of the Packer  
868 Engineering Report.

869 However, I dispute that the Company knew about the relief capacity from the  
870 Packer Engineering Report or that the Company was proactive in its root cause  
871 analysis.

872 Q. Why do you dispute the Panel's statement?

873 A. I reviewed the Packer Engineering Report to refresh my memory of the  
874 statements it made regarding the relief capacity of the produced water tank. The  
875 Packer Engineering Report does mention that under normal conditions the 24-  
876 inch manway provides adequate relief capacity. However, my comments in  
877 direct testimony (ICC Staff Exhibit 7.0, page 44) involved IP discovering that the  
878 combined relief capacity associated with the 6-inch and 3-inch openings in the  
879 produced water tank were sufficient to relieve the pressure buildup as a result of  
880 a Staff data request in a separate proceeding after Packer Engineering issued its  
881 report. This specific information was not discussed in the Packer Engineering  
882 Report; therefore, my conclusion that IP was not aware of this fact until Staff  
883 requested it remains unchanged.

884 Further, IP only had Packer Engineering determine the cause of the produced  
885 water tank explosion. I have seen no indication that IP followed up with any

review to determine what set of events allowed or caused the separator to release high pressure gas into the produced water tank in the first place. As I noted in my direct testimony, (ICC Staff Exhibit 7.0, pages 41-42), IP indicated “The contributing factors that resulted in the over-pressurization of Tank 402 are still being investigated. IP hasn’t established a “position” on what caused the over-pressurization...” I consider the factors that lead to the over-pressurization as the real root cause problem with the Hillsboro Incident; however, I have not seen any indication that IP conducted any further studies regarding that topic. Therefore, I continue to support my original conclusion that IP’s investigation into this event was lacking.

Hillsboro Storage Field Metering

Q. What did you conclude in your direct testimony regarding IP’s metering at Hillsboro?

A. I concluded that IP did not place a high priority on accurate measurement for withdrawals from the Hillsboro storage field immediately after the expansion of the field. IP failed to follow the minimum requirements from the AGA guidelines in order to ensure accurate measurement from its Hillsboro storage field.

Q. How did the Company respond?

A. The Panel testimony, IP Exhibit 14.1, page 33 noted that I admitted that the meter testing rules in Part 500 do not apply to metering used by utilities at storage fields and therefore saw no point in using them to making any

907 comparisons. The Panel also indicated (IP Exhibit 14.1, page 34) that it had  
908 reviewed Section 500.180 (which deals with orifice meter testing) and found it  
909 was obsolete and in need of updating, and that some of its requirements are  
910 unreasonable and inapplicable to current metering technology or would be  
911 unreasonable if applied to current technology.

912 The Panel also indicated that AGA Report #3 contains the guidelines for  
913 installation of orifice meters, but does not cover operation and maintenance; that  
914 the orifice plates used in the orifice meters when checked after six years of  
915 service were still service worthy; and the Panel discussed the inspection  
916 practices the Company used at Hillsboro prior to the Peterson Study.

917 Q. How do you respond to the Panel's statements?

918 A. With a few exceptions, I do not disagree with the Panel's statements, but I do  
919 disagree with the conclusion it draws from them.

920 I agree that the Section 500.180 provision contains somewhat dated language,  
921 but this does not mean its requirements are not valid. In fact, Staff, through its  
922 enforcement of Part 500, ensures every Illinois utility follows the intent of the  
923 requirements contained in that section.

924 I also agree that the operation and maintenance section of AGA Report #3 does  
925 not specify a required inspection cycle on the orifice plate. However, another  
926 AGA document does provide some basic guidance for orifice meters. The AGA



927 Gas Measurement Manual, Orifice Meters, Part No. Three, contains under

928 "Inspection Schedules" the following information:

929 The continued accuracy of an orifice meter state depends on keeping all  
930 of the station in proper operating condition. This depends on establishing  
931 and maintaining a fixed routine of inspection. Obviously, some items in a  
932 station should be inspected more often then others. Moreover, the  
933 inspection schedule for any station will depend upon many factors such as  
934 the importance of the station, the size in terms of gas flow, the location,  
935 the several types of equipment, company policies, etc. Therefore, the  
936 following is offered only as a guide to a minimum inspection schedule.

937 Primary Element

938 Orifice meter tubes should be removed annually for internal inspection and  
939 cleaning. This need may be satisfied by inspection caps where these are  
940 installed. Orifice plates should be removed and examined at least every  
941 three months.

942 Q. How does the above information apply to your current analysis?

943 A. The information contained in the AGA measurement manual further supports my  
944 contention that IP did not place a high priority on accurate measurement for  
945 withdrawals from the Hillsboro storage field immediately after the expansion of  
946 the field. As was indicated above, the post-expansion volume of gas that IP  
947 wanted to cycle from the field was 7.6 Bcf. Given the large volume of gas that  
948 would pass through the meter, I would expect that IP would operate under  
949 inspection and testing guidelines more stringent then used by IP at that time.

950 Hillsboro Metering Review

951 Q. What did you indicate in your testimony about IP's review of its metering error at  
952 Hillsboro?

953 A. I indicated that IP's latest estimate of the injection overstatement at Hillsboro (5.8  
954 Bcf) was almost 6 times larger than IP's original estimate (997,000 Mcf). I then  
955 indicated that this was just another indication of IP not fully investigating a  
956 problem at its storage fields.

957 Q. Did IP dispute your comments?

958 A. No.

959 Q. Did IP provide any additional information about its metering review?

960 A. Yes. The Panel testimony provided information about the use of the well charts  
961 to estimate the volume of injection overstatement and to determine a correction  
962 factor to use on the metering. The Company's response to Staff data requests  
963 ENG 1.92, 1.93 and 1.94 provide basic information regarding the timing and  
964 number of well charts IP had integrated. These responses indicate that IP had  
965 about 1500 of the 1994 well chart data integrated in the mid-1990s. These  
966 responses also indicate that the integration data from 624 of those charts was  
967 used when IP calculated the 22.1% correction factor in 2004 "Hillsboro Storage  
968 Field Deliverability Study Final Report". Therefore, in 1999 when IP determined  
969 the metering errors offset each other (IP Exhibit 14.1, page 9), IP was in  
970 possession of information that disputed that conclusion. This information lends  
971 further support for my conclusion that IP failed to fully investigate the metering  
972 problem at its Hillsboro storage field.

973

973 Gas Dispatch Tracking

974 Q. What did you indicate in your direct testimony about IP's ability to track its gas  
975 deliveries?

976 A. I indicated that even though IP had significant measurement errors that primarily  
977 occurred during the injection months when gas usage is the lowest, its load  
978 forecasting and dispatch group failed to notice an extra Bcf of gas entering its  
979 system every year for 6 years. I noted that this was another example of IP's  
980 failure to adequately oversee its operations.

981 Q. How did the Company respond to your testimony?

982 A. Mr. Shipp, IP Exhibit 13.1, pages 24-25, indicated that the 1 Bcf of gas that I  
983 noted in my direct testimony would equate to about 4,000 Mcf per day assuming  
984 an equal injection pattern throughout the injection season. Mr. Shipp then  
985 indicated that during the shoulder months of April, May, October and November  
986 the purchase volume runs around 300,000 – 400,000 Mcf. Mr. Shipp then  
987 indicated that a 4,000 Mcf error during that time period would not stand out as a  
988 significant error. Finally, he noted that IP maintains line pack on its system in the  
989 range of 0 – 10,000 Mcf, thus the amount of gas IP's dispatchers failed to notice  
990 was less than the line pack IP typically maintains on its system.

991 Q. How do you respond to Mr. Shipp's comments?

992 A. I believe that Mr. Shipp has over simplified the problem. In response to Staff  
993 data request ENG 1.50, Schedule ENG 1.50-1, IP provided the daily throughput  
994 volumes for IP's system for the period July 7, 2003 through July 13, 2003. Using  
995 this response, I reviewed the data for July 7, 2003. This data indicated that the  
996 system throughput for non-transportation customers was about 294,874 therms.  
997 Using the 4,000 Mcf/day value provided by Mr. Shipp, which is roughly equivalent  
998 to 40,000 therms/day, IP during the summer months was seeing a customer load  
999 forecasting error for its customers in excess of 13%. I would expect a utility  
1000 would be aware of errors of that magnitude regarding its forecasting and  
1001 dispatch. Therefore, I continue to support my original conclusion.

1002 Conclusion

1003 Q. What does all of the above information regarding your concerns about IP's  
1004 overall storage operations indicate to you?

1005 A. The above information tells me IP's actions over several years contributed to the  
1006 problems that IP encountered at the Hillsboro storage field. First, it is very  
1007 uncommon for a utility to reduce the peak day capacity of a storage field, yet IP  
1008 has reduced the peak day capacity of both of its largest storage fields, Shanghai  
1009 in 2001 and Hillsboro in 1999.

1010 Second, IP reduced the manpower levels associated with the oversight of its  
1011 storage fields. After reducing its manpower levels, IP's ability to identify and act  
1012 upon problems at its storage fields declined.

1013 Third, the Company reduced its capital spending at the storage fields below  
1014 historical levels. This may indicate that IP is being reactive rather than proactive  
1015 when determining when to make upgrades or other improvements at its storage  
1016 fields. A potential reason for a utility to behave in this fashion is that a utility will  
1017 not earn a return on its investments for improvements or upgrades at its storage  
1018 facilities until it requests and receives a natural gas rate increase from the  
1019 Commission. However, increased gas supply costs resulting from this behavior,  
1020 unless deemed imprudently incurred, are automatically passed through to  
1021 customers through the PGA.

1022 Finally, the events surrounding the Hillsboro incident and metering review  
1023 discussed above indicate that the Company's poor oversight does not allow IP to  
1024 properly identify and act upon the various problems facing its storage operations.  
1025 IP's inability, or more accurately, unwillingness to operate its storage in a safe,  
1026 reliable, and efficient manner also causes its ratepayers to incur additional costs.  
1027 Therefore, IP should be held accountable for its actions, or lack thereof, and the  
1028 Hillsboro storage field should be found to only be 53.44 percent used and useful  
1029 in this proceeding.

1030 Q. Does this conclude your rebuttal testimony?

1031 A. Yes.